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ABSTRACT

This publication includes abstracts of 45 articles published in recent years on the effects of maternal and paternal alcohol and other drug use on the fetus; prevention and intervention programs; and teaching strategies to be used with prenatally drug-exposed children. While not an exhaustive list of available research on these topics, this review of current literature indicates that further research needs to address topics that include: (1) developing reliable drug screening systems; (2) making treatment services available to drug-using women; (3) developing intervention programs for drug-exposed infants; (4) improving drug education and prevention programs in schools; (5) educating women of child-bearing age about the dangers of alcohol and drug use; and (6) developing training programs for professionals, parents, and educators in the care of alcohol- and drug-exposed children. Section 1 of this collection contains single-page abstracts of the 45 research articles. Each article is indexed by a set of keywords appropriate to its content. Section 2 is a subject index of the keywords. Section 3 is a reference list of the articles abstracted. Section 4 is a glossary of terms. (BC)

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Fetal Effects of Maternal/Paternal Alcohol and Other Drug Use: Abstracts of Selected Articles

August 1991

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Fetal Effects of Maternal/Paternal Alcohol and Other Drug Use: Abstracts of Selected Articles

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Although approximately 200 journal and magazine articles were collected over the past year, it was not feasible to abstract all of them for this project. This collection is not inclusive of all the current research available, but serves as a base for further expansion on this topic. The abstracts are intended to give the reader an overview of the research done on the effects of maternal and paternal alcohol and other drug use on the fetus and related issues, and to help identify challenges facing parents, educators, health professionals, and employers in regard to individuals with fetal alcohol and other drug effects. We hope this collection will assist you in your understanding of the issues surrounding this topic.

Judith A. Johnson, Director
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Fetal Effects of Maternal/Paternal Alcohol and Other Drug Use: Abstracts of Selected Articles

Although the effects of maternal and paternal alcohol and other drug use on the fetus have been recognized for many years, the research in this area is limited. In the past 20 years, researchers have begun to explore the physical and psychosocial effects of prenatal alcohol and other drug exposure. They are in agreement that alcohol and other drug use has deleterious effects on the fetus.

Drug-exposed individuals create health, social, and educational challenges for society. These infants are more likely to have a longer hospital stay and require more expensive care because they tend to be born prematurely, have a lower birth weight, and/or require other medical services. Some individuals require lifetime medical care, and others have developmental problems which impair their educational success and employability.

Forty-five articles published in recent years on the effects of maternal and paternal alcohol and other drug use on the fetus, prevention and intervention programs, and teaching strategies to be used with prenatally drug-exposed children are included in this collection of abstracts. This is not intended to be an all-inclusive list of current research available on this subject, but a sampling of the available literature on the topic.

It is apparent from the current literature on the maternal and paternal effects of alcohol and other drug use that more research and development of appropriate services need to be addressed in the following areas: (1) develop more reliable maternal/infant drug-use screening system; (2) make treatment and support services available for pregnant drug-abusing women; (3) develop intervention programs for drug-exposed infants beginning from birth; (4) develop an early identification program to detect alcohol and other drug-exposed infant/children who were not identified at birth; (5) implement, evaluate, and improve alcohol and other drug education and prevention programs in schools; (6) educate women of child-bearing age about the dangers of alcohol and other drug use to themselves, during pregnancy, and during breast-feeding.; (7) research long-term effects of prenatal alcohol and other drug exposure; and (8) develop training programs for health care professionals, parents, and educators in the diagnosis, care, and education of the prenatally alcohol and other drug-exposed child.

This collection is organized into four major sections: Section 1 contains single-page abstracts, presented alphabetically by principal author and indexed by a set of keywords appropriate to its content; Section 2 is the subject index of the keywords; Section 3 is the reference section; and Section 4 is a glossary of terms that may be helpful to use when reading these abstracts.

1. Abel, E.L. and Lee, J.A. "Paternal Alcohol Exposure Affects Offspring Behavior but not Body or Organ Weights in Mice." *Alcoholism: Clinical and Experimental Research* 12(3) (May/June 1988):349-355.

Male mice consumed liquid alcohol diets containing 20 percent, 10 percent, and 0 percent ethanol-derived calories (EDC) for 56 to 61 days. Mice which were fed the 10 percent and 0 percent EDC diets were paired together and fed with 20 percent EDC mice. A nontreated group was included in the study to assess the effects of pair feeding. After treatment, males were bred to nontreated females.

Results of the study indicated that litter size, birthweight, bodyweight at 21 and 55 days of age, and organ weights with the exception of the thymus were not affected by paternal alcohol ingestion. There was a dose-related decrease in activity at 20 and 24 days of age in an activity chamber and a dose-related decrease in serum testosterone levels at 55 days of age in male offspring sired by alcohol-consuming males. Offspring sired by males consuming the 20 percent EDC diet also required fewer trials to learn a passive avoidance task and had longer latencies to reach the choice point in a T maze.

Findings from this study indicate that paternal exposure to alcohol is capable of adversely affecting offspring behavior. One possible mechanism directly related to alcohol is the formation of toxic-free oxygen radicals which are known to cause DNA damage and could account for the paternally related effects described in this report, but further research is needed.

Keywords: Alcohol
Animal study
Birth weight
Paternal effects

2. Asetoyer, C. "Fetal Alcohol Syndrome Chemical Genocide," in *Indigenous Women on the Move*. Copenhagen: International Workgroup for Indigenous Affairs, Document No. 66, July 1990, pp. 87-92. (ERIC Document Service Reproduction No. ED 326 372).

On the northern plains of the United States, 100 percent of the Native American reservations are affected by alcohol and problems related to alcohol use and abuse. Approximately 90 percent of the adults are users, abusers, or recovering from alcohol abuse. Forty percent of all women drink alcohol during pregnancy and give birth to children suffering from either fetal alcohol syndrome (FAS) or fetal alcohol effects (FAE). FAS affects about 1 in 100 Native Americans and FAE affects about 1 in every 50 Native Americans born on the northern plains. Within two to three generations, every Native American household will have one spouse who is a descendant of a fetal alcohol birth if current trends are not changed. The future of entire nations (tribes) is at risk. The paper concludes with a description of the groups and organizations of Native American women who are making efforts to bring awareness of FAS to their communities and to educators, locally, nationally, and internationally.

Keywords: Alcohol
Fetal Alcohol Effects
Fetal Alcohol Syndrome
Native Americans

3. Barth, R.P. "Educational Implications of Prenatally Drug-Exposed Children." *Social Work in Education* 13(2) (January 1991).

Although emerging evidence indicates that children who are prenatally drug-exposed often can be educated in mainstream classes, these children will benefit most from structured, early-intervention services. The needs of these children tend to be similar to the needs of children who are born with either constitutional or environmental vulnerabilities. They need as much consistency of personnel as possible, a dependable family life, assistance in making transitions from activity to activity, interventions to teach social problem-solving, and help focusing on the task at hand. The staffs of preschool programs for perinatally drug-exposed children in the Los Angeles and San Francisco Unified School Districts have concluded that special education is not routinely necessary for these children, but they may need considerable assistance in preparing for and entering the first years of regular education. The intelligence of these children is generally not measurably impaired, their social behavior is somewhat maladaptive, and they may require considerably less or more stimulation than other children.

Inclusion of school social work, child welfare, and public health providers on P.L. 99-457 Interagency Coordinating Councils will ensure that those children experiencing the most profound physical and environmental threats are appropriately served.

Keywords: Cocaine
Early intervention
Interagency coordination
Maladaptive behavior
Prenatally Exposed Drug (PED) program
Preschool education
P.L. 99-457
Teaching strategies

4. Bellisimo, Y. "Crack Babies: The Schools' New High-Risk Students." *Thrust* (January 1990):23-26.

Crack babies, labeled as high-risk even before they are born, present a challenge to educators in order to meet their special academic and social/emotional problems. In order to best serve these drug-exposed children, four areas need to be addressed:

1. Develop cooperative alliances with day-care providers, families, schools, and health-care professionals to improve behavior and learning.

2. Study specific ways in which neurological damage caused by prenatal exposure to drugs is expressed in social behavior and academic deficits. Professionals report continued behavioral difficulties with temper tantrums and poor impulse control; lack of ability to regulate behavior; learning problems; and attention-deficit disorder and language problems.

3. Develop assessment tools to determine the nature and scope of the damage in regard to learning and behavior problems so that comprehensive intervention programs can be designed.

4. Devise research and implementation strategies for assisting teachers in working with drug-exposed children. Schools may need to participate with other agencies in providing parenting training.

The Los Angeles Unified School District began a pilot program three years ago for drug-exposed children, aged 3-6, which offers a developmentally appropriate learning experience based upon guidelines from the National Association for the Education of Young Children. This project recommends that programs for drug-exposed children have predictable environments and routines, be sensitive to transitions between activities, have a small ratio of children to adults, and provide for support and interaction with the child's parent(s).

Keywords: Cocaine
Communication
Cooperative alliances
Educational program
Maladaptive behavior
Neurological damage
Parent involvement
Prenatally Exposed Drug (PED) program

5. Bingol, N., Fuchs, M., Diaz, V., Stone, R.K., and Gromisch, D.S. "Fetal and Neonatal Medicine: Teratogenicity of Cocaine in Humans." *Journal of Pediatrics* 110 (January 1987):93-96.

The purpose of this study was to determine whether cocaine abuse by pregnant women had any deleterious effect on the developing embryo or fetus. Three groups of pregnant women and their offspring were studied: women who abused cocaine only; women who were polydrug abusers; women who were drug-free. All three groups were similar for socioeconomic status, cigarette smoking, and ethnicity (50 percent Black, 50 percent Hispanic).

Results of this study indicate that cocaine use in humans significantly reduces weight of the fetus, increases the stillbirth rate, and is associated with a higher malformation rate.

Keywords: Birth weight
Cocaine
Teratogenicity

6. Burgess, D.M. and Streissguth, A.P. "Educating Students with Fetal Alcohol Syndrome or Fetal Alcohol Effects." *Pennsylvania Reporter* (Newsletter by Pennsylvania Resources and Information Center for Special Education) 22(1) (November 1990).

Information on the impact of prenatal alcohol exposure on children and young adults, and suggestions for educational programs are described in this article. Considering the many academic and behavioral demands of children with fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE), educational programs should target functional skills necessary to promote independence at home, at school, and in the community; focus on the verbal, written, gestural, and behavioral aspects of communication that allow a person to participate in a social environment; consider the cultural origin of children and prepare them to function in the environments in which they will live as adults; and be community-based, with generalization as the major outcome of the educational program.

Keywords: Communication skills
Educational programs
Fetal Alcohol Effects
Fetal Alcohol Syndrome
Native American

7. Chasnoff, I.J. "Perinatal Effects of Cocaine." *Contemporary OB/GYN* (May 1987):163-164, 169-171, 175-176, 179.

Perinatal effects of cocaine and the important role of the physician in prevention and intervention are discussed in this article. A clinical assessment for substance-abuse should be performed by a physician and include an evaluation of physical appearance, a medical and obstetrical history, and a substance-abuse interview. Obstetric management of a woman who abuses drugs should require a multidisciplinary team consisting of an obstetrician practiced in identifying and treating the medical problems frequently encountered among addicted women, a psychologist/psychiatrist experienced in caring for persons addicted to drugs, and a specially trained nurse or social worker qualified to provide guidance and support. Other areas discussed in this article include pharmacology of cocaine, complications of pregnancy, and neonatal outcomes associated with cocaine used during pregnancy. In summary, a pregnancy complicated by substance abuse should be considered high risk and should elicit appropriate obstetric interventions.

Keywords: Clinical assessment
Cocaine
Cooperative alliances
Early intervention
Neonatal effects
Perinatal effects
Prevention

8. Chasnoff, I.J., Griffith, D.R., MacGregor, S., Dirkes, K., and Burns, K.A. "Temporal Patterns of Cocaine Use in Pregnancy: Perinatal Outcome." *Journal of the American Medical Association* 261(12) (March 1989):1741-1744.

Cocaine use patterns of 75 pregnant women and corresponding perinatal outcomes are compared with a matched group of pregnant women with no history or evidence of substance abuse. The 75 pregnant drug abusing women were all enrolled in a comprehensive perinatal program and were divided into two groups: those who used cocaine only in the first trimester of pregnancy and those who used cocaine throughout pregnancy.

Results of this study indicated that women who used cocaine throughout pregnancy had an increased rate of preterm delivery, low birth weight infants, and intrauterine growth retardation. Women who used cocaine only in the first trimester had rates of these complications similar to the drug-free group. Both groups of cocaine-exposed infants demonstrated significant impairment of orientation, motor, and state (condition of mind or temperament) regulation behaviors on the Neonatal Behavioral Assessment Scale.

Conclusions developed from this study have implications for both intervention and prevention. Intervention in early pregnancy with cessation of cocaine use will result in improved obstetric and neonatal outcome, but even early fetal cocaine exposure places the child at risk for neurobehavioral deficiencies and may have implications for long-term development.

Keywords: Assessment
Birth weight
Cocaine
Early intervention
Neonatal effects
Neurobehavioral functioning
Perinatal effects

9. Chasnoff, I.J., Landress, H.J., and Barrett, M.E. "The Prevalence of Illicit-Drug or Alcohol Use During Pregnancy and Discrepancies in Mandatory Reporting in Pinellas County, Florida." *New England Journal of Medicine* 322(17) (April 1990):1202-1206.

Florida is one of several states that have sought to protect newborns by requiring that a woman with a history of using illicit drugs or alcohol during pregnancy be reported to health authorities after delivery, even if her urine and the baby's are negative at the time of delivery. In Pinellas County, Florida, a study was conducted in which urine samples from all pregnant women who enrolled in either public or private health-care facilities were screened for alcohol, opiates, cocaine, and marijuana. Among the 715 women screened, 14.8 percent (106 women) tested positive for drug use. There was little difference in prevalence between women seen in public or private facilities, and the results were similar among White and Black women. During the six-month period in which data were collected, 133 women were reported to health authorities after delivery for substance abuse during pregnancy. Approximately 10 times more Black women were reported than White women, and poor women were more likely than others to be reported.

The results of this study indicate that the use of illicit drugs is common among pregnant women, regardless of race and socioeconomic status. Therefore, if legally mandated reporting is to be free of racial or economic bias, it must be based on objective medical criteria.

Keywords: Alcohol
Illicit drugs
Mandatory reporting
Toxicologic screening

10. Chasnoff, I.J., Lewis, D.E., and Squires, L. "Cocaine Intoxication in a Breast-Fed Infant." *Pediatrics* 80(6) (December 1987):836-838.

A 2-week-old infant girl ingested cocaine through her mother's breast milk. From information given by the mother, the infant showed symptoms of cocaine intoxication (tachycardia, tachypnea, hypertension, irritability, and tremulousness) within three hours after her mother began intranasal use. The infant in this study took 60 hours to clear the cocaine from her system.

Results of this case report indicate that because of the increasing prevalence of cocaine use, physicians should educate breast-feeding women concerning the hazards of cocaine use and its potential effects on the developing infant.

Keywords: Breast feeding
Cocaine
Cocaine intoxication
Toxicologic screening

11. Church, M.W. and Gerkin, K.P. "Hearing Disorders in Children with Fetal Alcohol Syndrome: Findings From Case Reports." *Pediatrics* 82(2) (August 1988):147-154.

Fourteen children diagnosed with fetal alcohol syndrome were evaluated by standard audiologic procedures. Thirteen of the 14 children studied had childhood histories of hearing disorders, and all 13 of these children had clinically significant histories of recurrent bilateral serous otitis media (painful inflammation of both middle ears), which occurred in early infancy and continued through late childhood. At least four children had sensorineural hearing losses, in addition to being otitis (inflammation of the ear) prone.

Since alcohol is embryotoxic and a number of embryotoxic drugs are known to cause sensorineural hearing loss in the immature ear, this study indicates that fetal alcohol syndrome is associated with an unusually high incidence of sensorineural hearing loss. Moreover, fetal alcohol syndrome is characterized by numerous neuroectodermal (the part of the embryo that becomes the brain and spinal cord) anomalies, which are traditionally associated with congenital sensorineural hearing loss. Based on this information, the results of this report suggest that hearing disorders are an unrecognized characteristic of fetal alcohol syndrome, and may be a contributing factor to the speech, language, and learning difficulties seen in children with fetal alcohol syndrome. Other findings provided evidence of visual, health, speech, and language disorders in children with this syndrome as well.

Keywords: Alcohol
Fetal alcohol syndrome
Hearing

12. Clarren, S.K. "Recognition of Fetal Alcohol Syndrome." *Journal of American Medical Association* 245(23) (June 1981):2436-2439.

Specific recognizable patterns of malformation are known as fetal alcohol syndrome (FAS). The clinical features of FAS include prenatal and postnatal growth deficiency, central nervous system (CNS) dysfunction, a particular pattern of facial characteristics, and major organ system malformations. The growth deficiency is usually moderate, with affected children below the third percentile for height and weight. Microcephaly is usually present from birth and may be the first sign of CNS dysfunction. Since many conditions feature growth and mental deficiency, it has become the striking facial characteristics of children with FAS that leads to a secure diagnosis. These include short palpebral fissures, short upturned nose, hypoplastic philtrum (underdeveloped vertical ridges and depression between nose and upper lip), hypoplastic maxilla (flat midface), and thinned upper vermilion (lip).

In terms of prevention, early education programs may be an important aspect as well as the identification of female alcoholics before pregnancy. The notion of mothering from conception, not birth, must be fostered in the nonpregnant woman.

Keywords: Alcohol
FAS Characteristics
Fetal Alcohol Syndrome
Prevention

13. Cole, C.K., Jones, M., and Sadofsky, G. "Working with Children at Risk Due to Prenatal Substance Exposure." *Prise Reporter* (Newsletter by Pennsylvania Resources and Information Center for Special Education) 21(5) (June 1990).

Teachers and staff of the Salvin Special Education Center in the Los Angeles Unified School District compiled a list of intervention strategies to be used with children who were prenatally exposed to drugs. They recommend that in order to be effective, intervention services must attempt to counteract prenatal risk factors and stressful life events. It is important to build protective factors into the classroom environment and to provide ways for these young children to cope appropriately with stress. These include respecting children's work and play space by keeping interruptions and adult distractions to a minimum; making demands that are developmentally appropriate; and letting the children learn through interaction, exploration, and play. Rituals and routines provide continuity and reliability which help strengthen a child's self-control and sense of mastery over the environment. It is essential that a working home-school partnership be developed in which school staff share their expertise, but listen carefully to what caregivers want and need. The teachers should let the child's history and actions guide the kind and intensity of reassurance, support, and intervention provided.

It is further recommended that the best approach in working with this population is to accept each child and family as having unique strengths and needs, and to provide interventions for children and families that can significantly improve the child's self-esteem, self-control, and ability to solve problems in the real world.

Keywords: Early intervention
Parent involvement
Prenatally Exposed Drugs (PED) program
Preschool Education
Self-esteem
Teaching Strategies

14. Davis, D.D. and Templer, D.I. "Neurobehavioral Functioning in Children Exposed to Narcotics in Utero." *Addictive Behaviors* 13 (1988):275-283.

The neuropsychological and behavioral status of children exposed to narcotics in utero was investigated using the Wechsler Intelligence Scale for Children-Revised (WISC-R), the Bender-Gestalt, the Quick Neurological Screening Test, and the Burks Behavior Rating Scales. Three groups of children ages 6 to 15 were studied. One group contained narcotic-exposed children and was subdivided into two subgroups of children who were heroin-exposed and methadone-exposed. Another group contained children in the control group whose mothers did not take narcotics during pregnancy but lived with a narcotic-addicted man at the time.

The results of the study indicated that narcotics-exposed children displayed an array of cognitive, perceptual-motor, and behavioral deficits. The narcotics-exposed children scored significantly lower than the control children on the WISC-R on the performance and full-scale IQs, and on most of the performance subtests. They scored in the more pathological direction on the Quick Neurological Screening Test in the areas of hand skill, figure recognition and reproduction, and behavioral irregularities. The narcotic-exposed children scored significantly lower on the neurological indicators of the Bender-Gestalt, and they scored significantly higher in the pathological direction on almost all of the behavioral variables on the Burks Behavior Rating Scale.

The study also indicates that methadone-exposed children have significantly greater neurobehavior difficulties than heroin-exposed children. This finding has broad ethical and societal implications, since it is possible that methadone treatment for maternal heroin addiction later produces more harm than benefit to children.

Keywords: Assessment
Heroin
Methadone
Neurobehavioral functioning

15. Donovan, C.L. "Factors Predisposing, Enabling, and Reinforcing Routine Screening of Patients for Preventing Fetal Alcohol Syndrome: A Survey of New Jersey Physicians." *Journal of Drug Education* 21(1) (1991):35-42.

A survey was sent to 217 New Jersey obstetricians and gynecologists listed in the 1984 Directory of Medical Specialists. The response rate to this survey was 26 percent. The survey indicated that New Jersey physicians do not routinely ask their pregnant patients about alcohol consumption for a wide variety of reasons, including physician bias due to their own abuse, lack of training for the task, poor awareness of the problem and its effects, denial that FAS occurs in private practice, time limitations, disinterest, fear of offending the patient, and belief that patients will not tell the truth about their alcohol use.

Findings from this study suggest there is a need for physicians to deal with conflicting attitudes regarding their own drinking behavior and that of their patients. There is also an indication that these physicians need organized support in developing skills for early detection and referral of patients at risk of negative fetal outcomes related to alcohol use.

Keywords: Alcohol
Early intervention
Fetal Alcohol Syndrome
Physician training

16. Eriksson, M., Billing, L., Steneroth, G., and Zetterstrom, R. "Health and Development of 8-Year-Old Children Whose Mothers Abused Amphetamine During Pregnancy." *Acta Paediatr Scand* 78 (1989):944-949.

Sixty-five children whose mothers were addicted to amphetamines during pregnancy were followed until 8 years of age, at which time they were tested in their homes. Only 21 children still remain in the custody of their biological mothers. Three groups of children were studied, and the children were grouped according to fetal drug exposure and placement in foster care. One group contained children who were exposed to amphetamines in the first trimester of pregnancy, and still lived with their biological mother. A second group contained children who were exposed to amphetamines throughout pregnancy, and still lived with their biological mother. The third group contained children who were exposed to amphetamines throughout pregnancy, but were placed in foster homes after birth.

The results of this study indicated that the physical health, IQ, and performance on several psychometric tests were within normal limits for most of these children. But increased incidences of aggressive behaviors, peer-related problems, and hyperactivity were found in the children, especially in the groups that had been exposed to amphetamines throughout pregnancy. The findings in this study indicate that intrauterine exposure to amphetamines causes prenatal damage, which cannot be fully compensated for by good psychosocial environments after birth.

Keywords: Amphetamines
Assessment
Hyperactivity
Maladaptive behavior

17. Friedler, G. "Effects on Future Generations of Paternal Exposure to Alcohol and Other Drugs." *Alcohol Health and Research World* (Winter 1987/88):126-129.

Research studies performed on mice in the laboratory at the Boston University School of Medicine have found that exposure of the male rodent to several different drugs can induce long-term changes in the normal developmental and behavioral patterns of subsequent offspring. Deficits in growth and developmental landmarks spanning several generations after paternal exposure to morphine have been observed and suggest a possible role for genetic factors in the effects of pregestational (before conception) exposure to morphine.

The major significance of these studies is the demonstration that limited alcohol consumption by males prior to mating can adversely affect the normal development of the offspring. The alterations present in both young and adult offspring of both sexes indicate that paternal exposure to alcohol can produce long-term and probably permanent changes in the offspring. The experiments also suggested that males may be more vulnerable to alcohol-induced alterations affecting certain behaviors, which supports findings in other reports on neurophysiological deficits among sons of human alcoholic fathers.

Keywords: Alcohol
Animal study
Morphine
Paternal effects

18. General Accounting Office, *Drug-Exposed Infants: A Generation at Risk. Report to the Chairman, Committee on Finance, U.S. Senate.* Report No. GAO/HRD-90-138. Washington, D.C.: General Accounting Office, Human Resources Division, June 1990.

The General Accounting Office investigated the growing number of infants born to mothers using drugs and the impact this is having on the nation's health and welfare systems. Areas studied included determining the number of infants prenatally exposed to drugs; health effects and medical costs of infants born exposed to drugs compared with the costs of those who were not; impact of these births on the social welfare system; and availability of drug treatment and prenatal care to drug-addicted women. Information was gathered through interviews from leading neonatologists, drug treatment officials, researchers, hospital officials, social welfare authorities, drug-addicted pregnant women, and a current review of the literature.

Among the fingings were: there is no consensus on the number of infants prenatally exposed to drugs each year because no standard protocols exist at health-care facilities for reliable screening for drug exposure; drug-exposed infants have more health problems and are more costly; drug-exposed infants often present immediate and long-term demands on the social welfare and education systems; and drug-treatment services are insufficient or inadequate to meet the demand for services of drug-addicted pregnant women.

The General Accounting Office recommends increasing federal funding so that comprehensive drug treatment and prenatal care can be provided to substance-abusing pregnant women, and to require states to include substance abuse treatment as part of the package of services available to pregnant women under Medicaid. Although these options would require more funds in the short-term, it is the consensus of the General Accounting Office that these options could save money in the long-term, as well as improve the lives of a future generation of children.

Keywords: Drug-exposed infants
Drug treatment
Financial impact
Maternal drug use
Toxicologic screenin

19. Giunta, C.T. and Streissguth, A.P. "Patients with Fetal Alcohol Syndrome and Their Caretakers." *Journal of Contemporary Social Work* (September 1988):453-459.

Because of the special needs of children with fetal alcohol syndrome (FAS), various types of support may be needed by the caretaker depending on the needs of the child. Assistance that may be needed by the caretaker may include information about fetal alcohol syndrome, peer support, financial support, respite care, and guidance to develop personal empowerment to be able to meet the special needs of their child, their family, and themselves. Also discussed in the report are the facial malformations, physical appearance, intellectual capabilities, behavior, medical needs, and educational needs associated with children with FAS.

Keywords: FAS characteristics
Fetal alcohol syndrome
Parent support

20. Greer, J.V. "The Drug Babies." *Exceptional Children* 56(5) (February 1990):382-384.

Educational services need to prepare for the new generation of special education students--the drug babies. Our knowledge base, educational technology, and resources will need to be developed in order to create an appropriate support structure for dealing with the special needs of these children.

In order to prepare our educational system for these children, six areas need to be addressed:

1. A full-scale coordination effort must begin now to integrate the institutions and agencies that provide leadership in policymaking, rulemaking, and legislation at community, state, and national levels.
2. Collect data on these children to determine programming and personnel training needs.
3. Special education degree-granting institutions will need to provide teachers with skills to deal with a whole new category of disabilities.
4. Ensure that assessment teams are prepared for the upcoming wave of referrals and are prepared to set up IEPs and programs.
5. Reintensify "child find" activities.
6. Overcome resistance to curriculum additions.

Most importantly, efforts must be redoubled on two strategies that are known to work to keep this problem from growing: prevention and education. The best way to help a drug baby is to keep its mother from taking drugs.

Keywords: Drug-exposed children

21. Griesbach, L.S. and Polloway, E.A. "Fetal Alcohol Syndrome: Research Review and Implications." (Topical paper, Lynchburg College) July 1990. (ERIC Document Service Reproduction No. ED 326 035).

The historical, epidemiological, physiological, and behavioral characteristics of fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE) are reviewed. Concerns related to the diagnosis, prevention, and intervention of FAS are also discussed. The review provides an overview of biological processes and critical periods of gestation, and examines the effects of FAS and FAE as related to central nervous system dysfunction, malformations of head and face, pre- and postnatal growth development, and several less frequently noticed anomalies.

FAS has been diagnosed in the children of women of all ages, races, and income levels. All types of alcohol can lead to FAS. However, some populations seem to be more susceptible to alcohol abuse and thus have a higher incidence of FAS-affected children, as seen in many Native American communities.

FAS traits are frequently overlooked at birth and can go undiagnosed for many years, resulting in tremendous frustration for both the affected individuals and their families. For this reason, it is suggested that special and regular education personnel and other human service professionals need to become better informed so that interventions can be developed to provide the FAS individual with the opportunity to live as near-normal a life as possible.

Keywords: Alcohol
Early Intervention
FAS Characteristics
Fetal Alcohol Effects
Fetal Alcohol Syndrome
Native American
Prenatal Effects
Prevention

22. Harping, J. "Cocaine Babies: Florida's Substance Exposed Youth." *Prevention Center* Tallahassee: Office of Policy Research and Improvement (OPRI), Florida Department of Education (1991).

The purpose of this booklet is to provide teachers, principals, district administrators, nurses, counselors, psychologists, and others who work with prenatally exposed children with background data, practical strategies for teaching and learning, and resources for networking. This information is outlined in six chapters: (1) substances and symptoms; (2) effects of prenatal exposure to alcohol and other drugs; (3) the role of the child's environment; (4) role of the school; (5) role of other helping professionals; and (6) resources available to aid the helping professional.

Included in this booklet is an excerpt from "Today's Challenge: Teaching Strategies for Working with Young Children Prenatally Exposed to Drugs/Alcohol," developed by the Children Prenatally Exposed to Drugs (PED) program of the Los Angeles Unified School District. This program was designed to provide guidelines for preschool programs to meet the needs of substance-exposed children.

Keywords: Curriculum design
Maternal drug use
Prenatally exposed
Drug (PED) program
Preschool education
Teaching strategies

23. Hayford, S.M., Epps, R.P., and Dahl-Regis, M. "Behavior and Development Patterns in Children Born to Heroin-Addicted and Methadone-Addicted Mothers." *Journal of the National Medical Association* 80(11) (1988):1197-1199.

A review of the literature regarding obstetrical and medical complications, behavior, and development patterns associated with maternal drug addiction and its effect on children from birth to six years of age is discussed in this report.

Obstetrical complications associated with heroin addiction include abortion, abruptio placentae, amnionitis, chorioamnionitis, placental insufficiency, intrauterine growth retardation, preeclampsia, and eclampsia. Newborns of heroin-addicted women were small for their gestational age, had a low birth weight, and had a smaller head circumference. Although babies of methadone-addicted women were noted to have a normal birthweight, they had greater postnatal weight loss because of hyperactivity and sleep disturbances. They also had a higher incidence of drug withdrawal with more severe symptoms when compared to babies of heroin addicts. Drug withdrawal lasted between six days and eight weeks, but symptoms of irritability persisted for more than three months.

Toddlers were found to be highly energetic, talkative, easily distracted, and exhibited brief attention spans. Cognitive, speech, and perceptual difficulties were also noted.

Preschool children of methadone-addicted women had a higher incidence of adverse behavior, a lower level of learning, difficulties adapting to new situations, and a lower general level of development compared to children of nonaddicted women.

The report also indicated that the incidence of sudden infant death syndrome in children born to opiate-addicted women was five times greater than in children born to nondrug-addicted women.

The report recommends that careful assessment and management of the behavior and development patterns of children of drug-addicted women be done both in the hospital and on follow-up visits, and that these children be enrolled in early intervention programs.

Keywords: Birth weight
Child development
Drug withdrawal
Early intervention
Heroin
Hyperactivity
Infancy effects
Maternal drug use
Methadone
Perinatal effects
Sudden Infant Death Syndrome

24. Howze, K. and Howze, W.M. "A Unique Program for Preschool Children of Substance Abusers," paper presented at the Annual Meeting of the Southern Association on Children Under Six, Richmond, VA, 13-16 April 1989. (ERIC Document Reproduction Service No. ED 306-015).

A pilot program in St. Petersburg, Florida, designed to meet the special needs of children of substance abusers has combined a child-care center with the case management of the abusing parents. The program was established at the Child Development and Family Guidance Center by Operation PAR, a nationally recognized substance abuse treatment and prevention program. The staff are well-trained preschool professionals who receive at least 40 hours of special training in substance abuse prevention by Operation PAR. Children are enrolled in the center after case managers have admitted the abusing parent to case management services. Screening with the Hawaii Early Learning Profile (HELP) has shown that the children tend to exhibit delays in fine motor development, language development, and social skills, as well as needing emotional and physical care support. Because of the children's lack of a stable relationship with an adult, the center staff decided that their initial goals when dealing with the children would be to provide patience, love, and acceptance. A typical preschool program was modified to allow for the children's developmental stages. In the first few months of the program's operation, days were arranged around activities, but as staff and children became more familiar with each other, a more definitive curriculum approach occurred. The staff found that it has been difficult to involve parents in their child's preschool experience, since many of the parents move frequently and the parents' inability to provide for their own basic needs often preempts concern for their child.

Keywords: Assessment
Child abuse
Child development
Curriculum design
Operation PAR
Parent involvement
Preschool education

25. Jones, C.L. and Lopez, R.E. "Component Report on Drug Abuse: Direct and Indirect Effects on the Infant of Maternal Drug Abuse." in *New Perspectives on Prenatal Care*, ed. by Merkatz and Thompson (New York: Elsevier Science Publishing Co., 1990).

The authors have compiled a comprehensive report on the direct and indirect effects of various drugs on the fetus. Included in this report are sections on background information, criteria for intervention, various types of intervention, studies (no programs met the criteria of the panel for inclusion), cost of interventions, recommendations, and references.

Included under the intervention section is a subsection on the "effects on each class of drug." Eight classes of drugs are discussed in detail in regard to a description of the drug, fetal risk summary, effects of the drug on maternal behavior, and problems associated with intoxication and fetal withdrawal. The eight classes of drugs studied include amphetamines, cannabis, cocaine, hallucinogens, inhalents, opioids, phencyclidine (PCP), and sedative, hypnotic, or anxiolytic (anxiety-relieving) drugs.

The authors recommend further research on the subtle, long-term effects of fetal drug exposure, and the development of good intervention programs that are vital in helping these children and society curb the cost of substance abuse.

Keywords: Child abuse
Cocaine intoxication
Drug treatment
Drug withdrawal
Early intervention
Financial impact
Maternal drug use
Toxicologic screening

26. Kronstadt, D. *Pregnancy and Cocaine Addiction: An Overview of Impact and Treatment*. Report from the Drug-Free Pregnancy Project. San Francisco: Far West Laboratory for Educational Research and Development, March 1989.

Information on the impact of maternal cocaine use during pregnancy, profiles of cocaine neonates, infants, toddlers, and preschool-age children, and recommended intervention strategies are discussed.

Practitioners from many of the major programs serving pregnant women and their offspring were asked to recommend effective intervention strategies. They recommend that comprehensive treatment programs be developed, collaborative interagency services be coordinated, supportive orientation be provided, parent education and quality child care be included, residential treatment and/or drug-free housing be made available, patient confidentiality be maintained, and accessibility be considered. Most importantly, the experts agreed that a critical need exists for the development of more treatment programs to serve the increasing numbers of drug-using pregnant women and their children.

Keywords: Child development
Cocaine
Drug-exposed children
Drug treatment
Early intervention
Infancy effects
Interagency coordination
Neonatal effects
Parent education
Parent support

27. Little, B.B., Snell, L.M., Rosenfeld, C.R., Gilstrap, L.C., and Gant, N.F. "Failure to Recognize Fetal Alcohol Syndrome in Newborn Infants." *American Journal of Diseases of Children* 144 (October 1990):1142-1146.

The underdiagnosis of fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE) are analyzed through clinical information recorded in maternal and infant medical records of 40 infants born to 38 alcohol abusers at Parkland Memorial Hospital in Dallas, Texas. These records were evaluated to determine the frequency of documented characteristics associated with fetal alcohol syndrome.

The results of the study indicated that primary features of FAS were recorded in the medical records of infants whose mothers drank excessively during pregnancy and the mother's medical records contained documentation of maternal alcohol use during pregnancy, but there was a 100 percent failure to diagnose the syndrome. These results verify the underestimated prevalence of FAS and FAE patients, and emphasize the importance of the need for better communication between obstetric and pediatric staff at the study hospital, particularly when providing care for pregnant women and newborn infants at high risk for complications due to maternal alcohol or other drug use.

Keywords: Alcohol
Communication
Fetal Alcohol Effects
Fetal Alcohol Syndrome

28. Little, R.E., Anderson, K.W., Ervin, C.H., Worthington-Roberts, B., and Clarren, S.K. "Maternal Alcohol Use During Breast-Feeding and Infant Mental and Motor Development at One Year." *New England Journal of Medicine* 321(7) (August 1989):425-430.

Four hundred infants born to members of a health maintenance organization were investigated to determine the relation of the mother's use of alcohol during breast-feeding to the infant's development at one year of age.

The results of this study indicated that mental development, as measured by the Bayley Mental Development Index (MDI), remained unaffected by maternal drinking during breast feeding at this age level. However, motor development, as measured by the Psychomotor Development Index (PDI), was significantly lower in infants exposed regularly to alcohol in breast milk. During the study, more than 100 variables were controlled for, including smoking and other drug use during pregnancy and in the postpartum period.

Since the sample consisted primarily of White, well-educated, middle-class women, it is recommended by the authors that further research using a larger sample of subjects from different populations be done to confirm their findings.

Keywords: Alcohol
Assessment
Breast feeding
Infancy effects
Motor development

29. Little, R.E. and Sing, C.F. "Association of Father's Drinking and Infants Birth Weight." *New England Journal of Medicine* 314(25) (June 1986):1644-1645.

Prenatal patients at a health maintenance organization were interviewed after delivery about the father's alcohol consumption during the month before conception.

The results of this study revealed that the father's drinking was strongly related to the infant's birth weight. Infants whose fathers were regular drinkers (consumption of at least 30 ml of ethanol daily or of 75 ml or more on a single occasion at least once a month) weighed an average of 181 grams less than those whose fathers were occasional drinkers.

These findings indicate a definite relation between paternal drinking and the size of the offspring in humans, and it is suggested that paternal alcohol use should be considered in all future research on the teratogenic potential of this drug.

Keywords: Alcohol
Birth weight
Paternal effects
Teratogenicity

30. Lockwood, S.E. "What's Known--and What's Not Known--About Drug-Exposed Infants." *Youth Law News*, Special Issue 1990, pp. 15-18.

Included in this article is a discussion about the confounding variables which affect the accuracy and reliability of our current research, and our understanding of the effects of drugs on the fetus. Further complicating the ability to draw conclusions from the research is the fact that there are considerable variations in the ways in which a fetus or an infant may be affected by prenatal drug exposure. Effects depend on the types and amounts of drugs used, the stages of pregnancy in which drug use occurred, the frequency of that use, and how environmental, physical, and psychosocial elements affect the mother, as well as the various genetic and physiological factors involved in the fetus' response to the drugs.

A few children appear to suffer short-term effects, while some appear to suffer lasting effects, but the majority of children fall somewhere in between. They appear to experience some effects to drug exposure, but how long these effects will last and how serious they are is still largely unknown. The only certainty is that the effects of prenatal drug exposure are much more likely to be of lasting detriment to children who do not receive services designed to counter these effects, and that they will need health, social, and child welfare services consistent with their individual needs.

Keywords: Drug-exposed infants

31. *Today's Challenge: Teaching Strategies for Working with Young Children Prenatally Exposed to Drugs/Alcohol.* Los Angeles Unified School District: Division of Special Education, Prenatally Exposed to Drugs (PED) Program, July 1989.

The Los Angeles Unified School District has piloted a preschool program for children who are born prenatally exposed to drugs or alcohol. The program is located on a regular elementary school campus in the Salvin Special Education Center, and at present consists of three classrooms and a transition kindergarten. The goals of the PED program are to develop a preschool program that incorporates a family focus, systematic interdisciplinary assessments, individualized programming, consistent teaching, and adequate adult-to-child ratios, and that promotes the cognitive, communicative, psychosocial, and motor development of these children.

Included in this report is a section on teaching strategies, which discusses normal child development in relation to the behaviors of at-risk children, and the best practice teaching strategies that have been used with these children and their families in the areas of learning, play, social/emotional, communication, motor development, and home/school partnerships to meet the educational needs of these children.

Keywords: Child development
Curriculum design
Preschool education
Teaching strategies

32. Revkin, A.C. "Crack in the Cradle." *Discover*, September 1989, pp. 62-69.

The number of cocaine-exposed babies is growing dramatically, doubling each year in many major cities. Some estimates put the number of drug-addicted babies born each year in the United States to be as high as 200,000. The cocaine problem crosses all lines of race, class, and geographical boundaries to infest not only our cities, but our suburbs and rural towns as well. Cocaine is not only destroying individual lives but overburdening obstetric and pediatric wards around the country, and adding to the high cost of health care. The effect is just beginning to be felt as these children start to enter our school systems.

The author discusses the research of Chasnoff on the effects of cocaine on pregnant women, Spear's research on nervous system development of female rats exposed to cocaine during the last half of pregnancy, and the Florida program, Operation Parental Awareness and Responsibility, which is an outreach and treatment program for drug-addicted women.

It is suggested that the only solution to the cocaine-baby problem would be to eliminate the conditions that lead a young woman, in the prime of life, to use cocaine.

Keywords: Cocaine
Maternal drug use
Operation PAR

33. Rist, M.C. "The Shadow Children." *American School Board Journal* (January 1990):19-24.

There is an increasing need for appropriate educational programs for children who are born to drug-addicted women. The first wave of crack babies is currently entering our school systems and we need to prepare ourselves.

The author indicates that the cost to public schools of providing structured, supportive learning environments for these children is bound to be high. But waiting to identify and treat drug-exposed children when they're enrolled in kindergarten is a mistake that could add substantially to the overall cost. Early intervention is the key to success. The overt aggression and extreme withdrawal characteristics of these children begin developing immediately after birth. In chaotic, nonsupportive home environments, these types of behaviors are necessary coping mechanisms for the child, and if left unchanged, these types of problems become firmly entrenched and increasingly difficult to change.

Five suggestions are offered on where to begin in preparing schools to meet the needs of drug-exposed children: (1) develop a system for early identification; (2) lobby for funds to develop intervention programs beginning from birth; (3) implement drug education and prevention programs in schools to teach students the skills they need to resist drugs; (4) provide appropriate classroom environments which foster stability and security; and (5) continue to conduct research on the long-term effects of prenatal cocaine exposure.

Keywords: Cocaine
Early identification
Early intervention
Financial impact
Preschool education
Prevention

34. Rosett, H.L., Weiner, L., and Edelin, K.C. "Treatment Experience with Pregnant Problem Drinkers." *Journal of American Medical Association* 249(15) (April 1983):2029-2033.

Therapy for heavy drinking was integrated with routine prenatal care at Boston City Hospital's women's clinic. Of 49 pregnant problem drinkers who participated in at least three counseling sessions, 33 reduced alcohol consumption before the third trimester. Therapeutic success was achieved with some of the heaviest drinkers. The desire to have a healthy baby was a powerful motivating force. Supportive counseling focused on reduction of alcohol consumption and potential benefits to the fetus. Planning of treatment strategies was facilitated by classifying the women into three phases: social (drinks primarily because of social pressures), symptom (drinks to relieve psychological symptoms), and alcohol-dependence (physiological dependence on alcohol).

The authors conclude that women who drink heavily, and whose offspring are at the greatest risk, will respond to individual supportive counseling provided by their health-care professionals.

Keywords: Alcohol
Early intervention
Therapeutic counseling

35. Schneider, J.W. and Chasnoff, I.J. "Cocaine Abuse During Pregnancy: Its Effects on Infant Motor Development--A Clinical Perspective." *Topics in Acute Care and Trauma Rehabilitation* 2(1) (July 1987):59-69.

Effects of cocaine prior to birth, during the newborn phase, and during infancy, as well as discussions on the benefits of intervention programs prior to birth and after birth, are discussed in this report.

After initiation of the Brazelton Neonatal Behavioral Assessment Scale (BNBAS) to infants at the Perinatal Center for Chemical Dependence (PCCD) in Chicago, Illinois, it was found that infants born to drug-addicted mothers often demonstrate poor interactive abilities and poor state control (inability to keep self calm). These infants are characterized as irritable, hypertonic infants who are easily overstimulated. They are frequently in overly extended postures and demonstrate poor quality of movement (tremors), have difficulty establishing midline orientation or preventing their muscles from going into extension, and may exhibit feeding problems related to abnormal tone and movement patterns. Treatment concepts discussed to help correct these abnormalities included proper positioning, handling, carrying, feeding, and play positions for the infant.

Keywords: Assessment
Cocaine
Early intervention
Infancy effects
Motor development
Neonatal effects
Parent education
Perinatal effects
Physical Therapy

36. Shaw, P.E. "Cocaine + Adolescence = Perilous Pregnancies." *Adolescent Counselor*, February/March 1990, pp. 25-29.

Adolescent pregnancies complicated by drug use are rapidly becoming a major health and social concern. Due to the effects of cocaine use, the health of adolescent mothers and their children are in jeopardy. According to a survey conducted by the National Institute on Drug Abuse, the percentages of high school seniors who tried cocaine went from 9 percent in 1975 to 16 percent in 1982. Since these figures reflect drug use among adolescents completing high school, it is assumed that this increase is comparable in high school dropouts. Although this survey did not look specifically at the rate of drug use among pregnant adolescents, there is evidence that sexual activity, pregnancy, and substance abuse in adolescents are interrelated. Pregnant adolescents are more likely to be substance abusers than adolescents who are not sexually active.

Detailed information on the effects of cocaine on women and pregnancies, medical effects on the newborn, and behavioral problems found in infants were also discussed.

The author recommends that prevention programs aimed at educating adolescents to the dangers of drug use to themselves and during pregnancy must be implemented, especially since fetal exposure to cocaine often occurs before mothers are aware they are pregnant.

Keywords: Adolescent pregnancies
Cocaine
Infancy effects
Neonatal effects
Perinatal effects
Prevention

37. Skolnick, A. "Cocaine Use in Pregnancy: Physicians Urged to Look for Problem Where They Least Expect It." *Journal of American Medical Association* 264(3) (July 1990):306-307.

According to the author, the problem of cocaine use during pregnancy is being ignored by too many physicians who think that drug abuse by pregnant women is a problem of minorities, urban populations, and lower socioeconomic groups. Utilizing the research of Chasnoff, the author concludes that there is little difference in the prevalence of substance abuse among women who receive care at public or private facilities, and race is no indicator for predicting whether a woman will abuse illicit drugs or alcohol during pregnancy.

The belief by some women that cocaine will shorten labor was discussed and disproven, as was the belief that using cocaine will give a women a better high out of delivery.

Since many middle-class women have never been informed by their physicians about the risks of drug use during pregnancy, the author recommends that physicians ask their patients about their lifestyles, and their use of drugs, alcohol, and cigarettes during their prenatal visits, and report those who have abused drugs to a drug treatment program.

Keywords: Alcohol
Cocaine
Illicit drugs
Toxicologic screening

38. Skolnick, A. "Drug Screening in Prenatal Care Demands Objective Medical Criteria, Support Services." *Journal of American Medical Association* 264(3) (July 1990):307, 310.

A study by researchers at the Medical Center of Delaware, Inc., Newark, suggests that including urine drug screening as part of routine prenatal care and providing supportive services may improve pregnancy outcomes among high-risk populations. Such is the case at a Wilmington hospital that implemented universal drug screening for all pregnant women receiving prenatal care. Patients whose urine tested positive for illicit drugs were offered special services to reduce the risks for both mother and child.

Mandatory drug screening may not work as well in states where physicians are required to report evidence of drug use during pregnancy to state health authorities or to child protective services. Because of the fear of losing their children and being prosecuted for child endangerment or for illicit drug use, many at-risk women may be discouraged from seeking medical assistance.

The author discusses the research of Chasnoff in which he found discrepancies in the rates at which Black and White and poor and affluent pregnant women were reported for substance abuse, and concludes that legally mandated reporting must be based on objective medical criteria in order to be free of racial or economic bias.

Keywords: Illicit drugs
Mandatory reporting
Toxicologic screening

39. Streissguth, A.P., Aase, J.M., Clarren, S.K., Randels, S.P., LaDue, R.A., and Smith, D.F. "Fetal Alcohol Syndrome in Adolescents and Adults." *Journal of American Medical Association* 265(15) (April 1991):1961-1967.

Sixty-one adolescents and adults ranging in age from 12 to 40 years suffering from alcohol teratogenesis (embryonic maldevelopment that causes serious congenital defects) were used in a study which occurred between 5 and 12 years after their original diagnostic examination. The follow-up examination consisted of an intellectual examination, an academic examination, physical measurements, photographs, a medical records review, and an interview with the primary caretaker for social-behavioral information.

The results of this study indicate that fetal alcohol syndrome is not just a childhood disorder, because there is a predictable long-term progression of the disorder into adulthood. After puberty, the faces of patients with fetal alcohol syndrome or fetal alcohol effects were not as distinctive. Patients tended to remain short and microcephalic. The average IQ was 68, but the range of IQ varied widely. Average academic functioning was at the second- to fourth-grade levels, with a significant deficit in arithmetic skills. This deficit appeared to be central to their difficulty with independent living, poor judgment, and generally dysfunctional lives, which reflected their extreme difficulties with abstractions like time and space, cause and effect, and generalizing from one situation to another. Maladaptive behaviors such as distractibility and difficulty perceiving social cues were common. Family environments were remarkably unstable, and on the average most patients had lived in at least five different principal homes during their lifetime.

Since only a few of these patients were diagnosed as having FAS in infancy, the physician can play an important role in the recognition of FAS among disabled youths and adults. Information on maternal and paternal drinking history should be routinely obtained in any work-up of patients of any age diagnosed as having developmental disabilities, attentional deficits, and/or conduct disorders.

Keywords: Academic achievement
Alcohol
FAS characteristics
Fetal Alcohol Effects
Fetal Alcohol Syndrome
Maladaptive behavior

40. Streissguth, A.P. and LaDue, R.A. "Fetal Alcohol: Teratogenic Causes of Developmental Disabilities." *Substances and Mental Retardation*, Washington D.C.: American Association on Mental Deficiency (1987), pp. 1-32.

This report reviews the historical perspective of alcohol teratogenesis (embryonic maldevelopment that causes serious congenital defects); diagnostic considerations of children with Fetal Alcohol Syndrome (FAS) and Fetal Alcohol Effects (FAE); and subsequent implications for the fields of mental retardation and developmental disabilities in regard to areas of the child's level of functioning, behavior and performance, and adaptive and academic functioning.

The authors' recommendations for prevention include public health recommendations and general policy statements from influential organizations cautioning against alcohol use during pregnancy; campaigns to inform the public about risks of drinking during pregnancy; educational campaigns for inservice training of health-care professionals and educators; and assessment of alcohol use during pregnancy in conjunction with supportive services for pregnant women with drinking problems.

It is recommended that intervention should focus on early identification of affected children because early diagnosis is the key to providing proper care and case management for these children. Ideally, this diagnosis should be made at birth so that appropriate interventions can be undertaken immediately for the benefit of mother and child.

Keywords: Alcohol
Early identification
Early intervention
Fetal Alcohol Effects
Fetal Alcohol Syndrome
Physician training
Prevention
Teratogenicity

41. Streissguth, A.P. and Randels, S. "Long Term Effects of Fetal Alcohol Syndrome," in *Alcohol and Child/Family Health*. Edited by G.C. Robinson and R.W. Armstrong. Vancouver, B.C.: University of British Columbia, 1988.

Information from several studies (Streissguth, LaDue, and Randals, 1987; Streissguth, Clarren, and Jones, 1985; May and Hymbaugh, 1982; and May, Hymbaugh, Aese, and Samet, 1983) was used and compared in order to reach the following conclusions.

1. Individuals with Fetal Alcohol Syndrome (FAS) and Fetal Alcohol Effects (FAE) have long-lasting disabilities enduring into adolescence and adulthood.

2. Individuals with a diagnosis of FAS are significantly more intellectually impaired than those with a diagnosis of FAE.

3. The most handicapping disability for individuals with FAS or FAE is poor adaptive behavior.

4. Individuals with FAS and FAE have more psychosocial and behavioral problems that require additional interventions beyond their specialized educational needs.

5. The most differentiating physical characteristics of adolescents and adults with FAS/FAE are shortness of stature, microcephaly, smooth philtrum, thin upper lip, and malformed or malaligned teet.

The authors suggest that early diagnosis of people with FAS/FAE is the key to the development of appropriate educational, mental health, vocational rehabilitation, and residential programs in order for their specialized needs to be met and to facilitate their optimal development.

Keywords: Alcohol
Early identification
FAS characteristics
Fetal Alcohol Effects
Fetal Alcohol Syndrome
Maladaptive behavior

42. Streissguth, A.P., Sampson, P.D., and Barr, H.M. "Neurobehavioral Dose-Response Effects of Prenatal Alcohol Exposure in Humans from Infancy to Adulthood." *Annals New York Academy of Sciences* (1989):145-158.

Results of two separate studies, which both concern long-term developmental and behavioral consequences of prenatal alcohol exposure, are discussed in order to observe the contributions of dose to the teratogenic (causes developmental malformations) effect of alcohol. The first is a clinical study of 92 subjects, 12 to 42 years of age, from four Indian reservations in the southwestern United States, who were originally referred because they were suspected of having clinical manifestations of fetal alcohol exposure. The second is a longitudinal prospective study in which a large, unselected group of pregnant women were interviewed during pregnancy regarding their alcohol use. A follow-up cohort of 500 offspring was examined at several key developmental ages between birth and seven years of age.

The studies found that intellectual impairment persists into adulthood in people with Fetal Alcohol Syndrome (FAS) and Fetal Alcohol Effects (FAE). Those with more physical manifestations of alcohol teratogenesis have a poorer intellectual outcome than those with fewer physical manifestations. For moderate levels of exposure the effects of alcohol teratogenesis are less dramatic, but nevertheless statistically significant.

In the area of academic achievement, the studies found that prenatal alcohol exposure is associated with severe and prolonged impairment in mastery of educational skills, which continues to adulthood. It is also noted that cognitive processes required for the acquisition of arithmetic skills are more vulnerable to prenatal alcohol exposure than those required for early word recognition or spelling. These deficits may have more subtle manifestations in other aspects of daily life, such as judgment, problem solving, and memory.

The results of this study indicate that the neurobehavioral effects of prenatal alcohol exposure show a dose-response relationship. Higher levels of prenatal alcohol exposure are associated with more severe effects, while moderate levels of exposure are associated with more subtle effects.

Keywords: Academic achievement
Alcohol
Fetal Alcohol Effects
Fetal Alcohol Syndrome
Native American
Neurobehavioral functioning
Teratogenicity

43. Van de Bor, M., Walther, F.J., and Ebrahimi, M. "Decreased Cardiac Output in Infants of Mothers Who Abused Cocaine." *Pediatrics* 85(1) (January 1990):30-32.

The effect of intrauterine cocaine exposure on cardiac output was studied in 15 full-term newborn infants whose mothers used cocaine during pregnancy. A total of 22 healthy nonexposed, full-term infants served as a control group. Utilizing Pulsed Doppler echocardiography on the first day of life, cardiac output and stroke volume were significantly lower and arterial blood pressure was significantly higher in the infants exposed to cocaine. On the second day, cardiac output, stroke volume, and mean arterial blood pressure were similar, probably because of the gradual excretion of cocaine and its metabolites by the infant. It was speculated that an increase in plasma norepinephrine levels is responsible for the cardiovascular effects of intrauterine cocaine exposure.

The authors concluded from the findings in this study that intrauterine cocaine exposure decreases cardiac output and stroke volume and increases mean arterial blood pressure. The authors suggested that these findings may have clinical consequences for the infant exposed to cocaine who experiences temporary abnormal functioning of the muscles of the heart caused by severe stress at birth.

Keywords: Cardiac effects
Cocaine
Maternal drug use

44. Weiner, L. and Larsson, G. "Clinical Prevention of Fetal Alcohol Effects--A Reality." *Alcohol Health and Research World*, Summer 1987, pp. 60-63, 92-93.

Laboratory and clinical findings are summarized in support of effective fetal alcohol syndrome (FAS) prevention through intervention programs during pregnancy. Prevention and intervention programs at Boston City Hospital, Huddinge Hospital of Stockholm, a pregnancy and health program in Seattle, and a program at Grady Memorial Hospital in Atlanta have demonstrated a successful clinical approach for prevention: identify pregnant women who drink heavily and provide supportive counseling focused on abstention. Although these programs treated populations of different genetic compositions, in different geographic regions, and under different health-care systems, they have independently achieved similar improvements in pregnancy outcome, which demonstrates the viability of clinical intervention.

The results of these studies indicated that infants born to women who had been drinking heavily and had reduced consumption differed significantly in both weight and head circumference from the children of women who continued to drink heavily through the end of their pregnancy. The infants of mothers who responded to the counseling resembled the infants of rare and moderate drinkers. These results suggest the value of clinical intervention for the prevention of alcohol-related birth defects.

Keywords: Alcohol
Early intervention
Fetal Alcohol Syndrome
Infancy effects
Prevention

45. Wilson, G.S., McCreary, R., Kean, J., and Baxter, J.C. "The Development of Preschool Children of Heroin-Addicted Mothers: A Controlled Study." *Pediatrics* 63(1) (January 1979):135-141.

Three- to six-year-old children of heroin-addicted mothers were compared to three other groups matched for age, race, sex, birth weight, and socioeconomic status. The research sample consisted of 77 children divided into four comparison groups: (1) heroin-exposed children whose mothers used heroin as the predominant drug of abuse during pregnancy; (2) children born to women who did not use drugs during pregnancy, but who were involved with narcotics addicts; (3) children born to mothers who denied use of drugs, but the infants showed medical factors, such as dysmaturity, intrauterine growth retardation, fetal distress, and disturbed transition; and (4) children whose mothers did not use drugs, but lived in the same geographic area.

Results of the study indicated that heroin-exposed children weighed less and were shorter than those in the comparison groups, and 14 percent had a head circumference below the third percentile. Although the overall performance of the children in the heroin-exposed group fell within the normal range on the examinations, this group consistently ranked lower than the comparison groups on physical, intellectual, perceptual, and behavioral measures.

Keywords: Abstinence Syndrome
Child Development
Heroin
Infancy effects

Fetal Effects of Maternal/Paternal Alcohol and Other Drug Use: Abstracts of Selected Articles

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Glossary

Aberrant	Deviating from the usual or normal course.
Abruptio placentae	Premature separation of the placenta prior to delivery of the infant.
Amnionitis	Inflammation of the thin membrane fluid-filled sac surrounding the embryo.
Amphetamines	Stimulant drug that causes intoxication, withdrawal, delirium, and delusional disorders.
Anomalies	Any deviation from the usual, especially as a result of congenital or hereditary defects.
Anxiolytic drugs	Central nervous system depressants.
Bilateral Serous Otitis Media	Inflammation of both middle ears.
Cannabinoids	Any chemical constituents of marijuana.
Central Nervous System (CNS)	Supervises and coordinates entire nervous system; structures of nervous system include brain, spinal cord, and optic nerve to which sensory impulses are transmitted and from which motor impulses pass out.
Chorioamnionitis	Inflammation of fetal membranes.
Cocaine	A bitter crystalline alkaloid obtained from coca leaves; highly addictive stimulant.
Congenital	Existing before or at birth.
Deficit	A deficiency or lack; an impairment in a particular function.
Dysmaturity	A marked difference in the degree of maturation of various fetal structures.
Dysmorphology	The study of birth defects or malformations in a species.

Eclampsia	A disease occuring in latter half of pregnancy characterized by an acute elevation of blood pressure, edema, sodium retention, convulsions, and sometimes coma.
Embryo	A young organism in early stages of development; from conception to 8th week of gestation.
Embryotoxic	Poisonous to embryo.
Epicanthal folds	Heavily folded eyelids formed by a flop of skin over the corner of the eye in races where this is not seen.
Ethanol	A colorless, volatile liquid, which as a basis for alcoholic beverages, acts as a central nervous system depressant.
Fetal Alcohol Effects	Associated with prenatal alcohol exposure, but inadequate physical or behavioral symptoms for a diagnosis of fetal alcohol syndrome.
Fetal Alcohol Syndrome	A medical diagnosis based on a cluster of physical and behavioral characteristics in three areas: 1) growth retardation before and/or after birth; 2) a pattern of abnormal features of the face and head; and 3) evidence of central nervous system abnormality. This is associated with a history of maternal alcohol consumption during pregnancy.
Fetus	The unborn offspring; 8th week after fertilization until birth.
Gestation	The period of intrauterine development from conception to birth.
Gravidity	Pregnancy
Hallucinogens	A substance that produces hallucinations - an alteration in perception which may be auditory, visual, tactile, olfactory, gustatory, or any combination.
Heroin	A bitter, white crystalline narcotic.
Hirsutism	A condition characterized by growth of hair in unusual places and in unusual amounts.
Hyperactivity	Excessive or abnormal activity.

Hypertension	Excessive tension or pressure; high blood pressure.
Hypertonic	Excessive or above normal in tone or tension.
Hypoplastic maxilla	Underdeveloped bone of upper jaw
Hypoplastic philtrum	Underdeveloped depression of vertical ridges between nose and upper lip.
Hypotonic	Below normal strength or tension.
Maternal	Pertaining to mother.
Methadone	A narcotic analgesic used for maintenance treatment of heroin addiction.
Microcephaly	Abnormal smallness of the head, congenital, and usually associated with mental retardation.
Micrognathia	Small chin.
Myocardial dysfunction	Abnormal functioning of muscular tissue of heart.
Neonatal	Newborn infant up to first month after birth.
Neurobehavioral	Behaviors stemming from neurological origins.
Nystygmus	Rapid back and forth movement of the eyeballs.
Operation PAR	Operation Parental Awareness and Responsibility (PAR) is an outreach and treatment program for drug-addicted women in Florida. This program established a preschool for children of substance abusers, which combines a child care center with the case management of the abusing parent.
Opiads	Nonsynthetic narcotics derived from opium.
Otitis	Inflammation of the ear.
Palmer crease	Any of the normal grooves across the palm which accommodate flexion of the hand. In certain congenital anomalies, there is only a single transverse crease.
Palpebral fissures	The slits or openings that the eyes look out of.

Parity	Number of times a woman has given birth.
Paternal	Pertaining to a father.
PED Program	Children Prenatally Exposed to Drugs program in the Los Angeles Unified School District.
Perinatal	The period shortly before and after birth generally considered to begin with completion of 28 weeks of gestation and ending 4 weeks after birth.
Placenta	The organ on the wall of the uterus to which embryo is attached.
Polydrug use	The use of two or more drugs simultaneously or interchangeably in an attempt to augment or modulate the effects of one drug with the other.
Postnatal	Happening after birth.
Prenatal	Existing or occurring before birth.
Psychosocial	Pertaining to or involving both psychological and socail factors.
Ptosis	Droopy eyelids
Sensorineural hearing loss	Loss of hearing due to damage to sensory nerves.
State control	Ability to keep self calm.
Strabismus	Crossing eyes.
Sudden Infant Death Syndrome (SIDS)	The syndrome of sudden, unexpected death of an apparently healthy infant, occurring almost always during a sleep period and usually between 1 to 4 months of age.
Syndrome	A group of symptoms or signs that collectively characterize a particular disease or abnormal condition.
Tachycardia	Excessive rapidity of heart's action.
Tachypnea	Abnormally rapid rate of breathing.
Teratogen	Drug or agent that causes abnormal development in utero.

Toxemia of Pregnancy	A metabolic disturbance in pregnancy characterized by hypertension, albuminuria, and edema.
Toxicologic screening	Urine test for poisons/drugs.
Tremulous	Shaking, trembling, or quivering.
Trimester	A period of three months into which the nine months of pregnancy can be divided.
Upper vermilion	Upper lip.